

Shun-ichi UDAGAWA\* & Seiichi UEDA\*\*: *Eremodothis angulata* and  
*Apodus oryzae*, two rare Plectomycetes from marine sludges

宇田川俊一\*・上田成一\*\*: 海泥から分離された不整子のう菌類2珍種,  
*Eremodothis angulata* および *Apodus oryzae*

During a survey of the polluted fungi of Nagasaki Prefecture, Japan (Ueda, 1981) conducted in 1979, two unfamiliar Plectomycetes were found and isolated from marine sludges collected from the coastal waters of Nagasaki Bay. Although these fungi resemble members of the genus *Thielavia* in many respects, they show distinct differences from all species included within this genus. After an extensive search of the literature concerning *Thielavia*-like fungi, the authors have determined that the species can be assigned to previously known species of genera *Eremodothis* and *Apodus* respectively but represent only the second instance of the discovery of both. Therefore, they have been described in detail taxonomically. The specimens studied are preserved at the Mycological Herbarium, National Institute of Hygienic Sciences, Tokyo (NHL).

***Eremodothis angulata*** (Das) von Arx, Kavaka 3: 34. 1975.

≡ *Thielavia angulata* Das, Trans. Br. mycol. Soc. 45: 545. 1962.

Ascocarps scattered, immersed to semi-immersed, black, globose to subglobose, 240–500  $\mu\text{m}$  in diam, nonostiolate, glabrous or sparingly covered with hyaline, straight or somewhat undulate, septate, smooth-walled, hyphal-like hairs measuring 2–2.5  $\mu\text{m}$  in diam. Peridium dark olive brown, thin, about 5–8  $\mu\text{m}$  thick, membranaceous (textura angularis), pseudoparenchymatous, non-cephalothecoid, two-layered; outer layer composed of pale olive brown, thick-walled, isodiametric, polyhedral cells measuring 4–8(–12)  $\times$  2.5–7.5  $\mu\text{m}$ ; inner layer of hyaline, angular cells. Asci bitunicate, arising singly from ascogenous hyphae which originate in the central part of the ascocarp cavity, irregularly disposed, 8-spored, globose to subglobose or broadly ovate, 27.5–37.5  $\times$  26–30(–32)  $\mu\text{m}$ , short-stipitate, evanescent at maturity. Pseudoparaphyses hyaline, filiform, branched, entwined, up

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to  $2\ \mu\text{m}$  in diam. Ascospores crowded in the ascus, one-celled, brown, at first heart-shaped or asymmetrically ovate with rounded tips, then becoming mostly pyramid-shaped, sometimes stellate,  $15\text{--}20\text{--}(24) \times 12.5\text{--}17.5\ \mu\text{m}$ , with four lobes measuring  $2.5\text{--}5\ \mu\text{m}$  in height, smooth-walled, without a germ pore or germ slit. Anamorph not formed.

Mycelium composed of hyaline, branched, septate, smooth-walled hyphae,

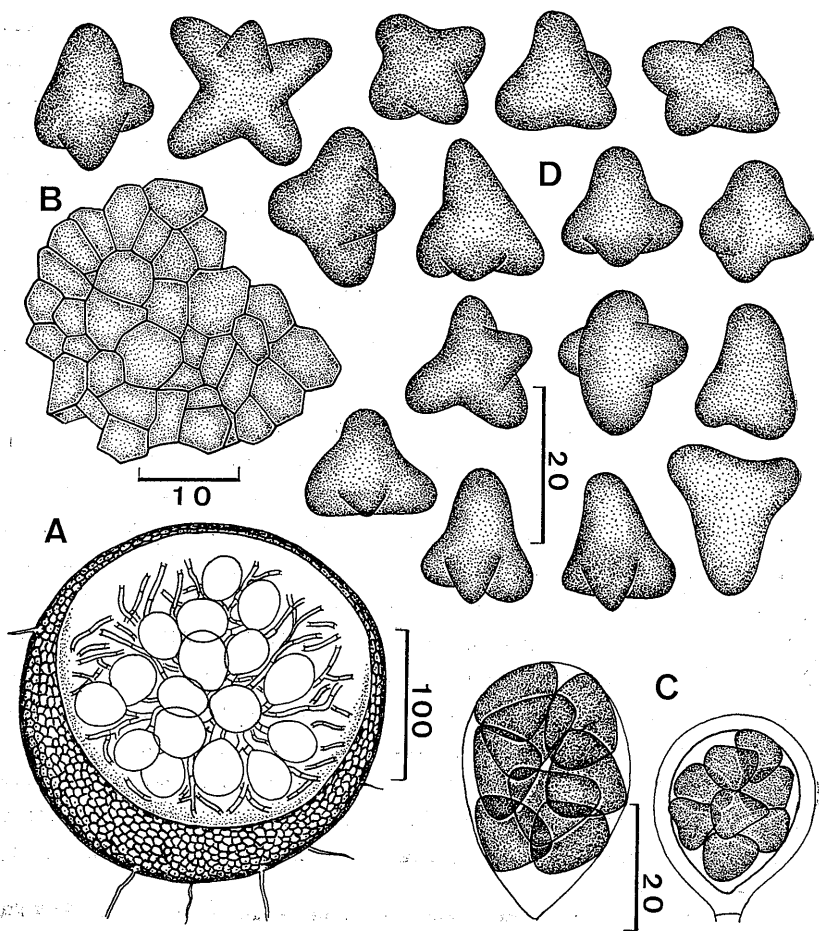


Fig. 1. *Eremodothis angulata*, No. 2886, NHL. A: Ascocarp. B: A portion of the ascocarp peridium. C: Asci. D: Ascospores. (All measurements in  $\mu\text{m}$ .)

2-4(-6.5)  $\mu\text{m}$  in width.

Colonies on potato-carrot agar spreading broadly, attaining a diameter of about 8.5 cm within 3 weeks at 20-23°C, consisting of a thin, submerged vegetative mycelium, with the surface producing white, sparse aerial hyphae, salmon to saffron in color; ascocarps scattered as black dots; reverse uncolored to salmon. Colonies on oatmeal agar resemble those on potato-carrot agar, but aerial hyphae more abundantly produced, honey to hazel in color; reverse honey colored.

At 37°C, the growth-rate is the same as that at 20-23°C, but ascocarps are reduced.

Isolation: marine sludge, Nagasaki Bay, Nagasaki City, Japan, 28 August 1979, collected by S. Ueda, No. 2886, NHL.

Other specimen examined: culture received from Commonwealth Mycological Institute, Kew, England, No. 90323, IMI.

The monotypic genus *Eremodothis* is characterized by cleistothecial ascocarps, bitunicate, nearly globose asci and one-celled, angular ascospores without recognizable germ pores or germ slits. *Eremodothis angulata* was originally described by Das (1962) as a new species of *Thielavia* from paddy field soil in India. However, it is a very distinctive species not easily confused with any other *Thielavia* species and, for this reason, Malloch and Cain (1973) excluded it from the genus. At that time, they were not prepared to comment upon its correct placement. Von Arx (1975b) assigned the genus in the vicinity of the Sporormiaceae of the Dothideales (Loculoascomycetes), while stating that its position within the Ascomycetes was not clear. In the opinion of the authors, the fungus is probably a member of the Testudinaceae (nonostiolate counterparts of different genera in the Pleosporaceae after von Arx and Müller, 1975), although it was not mentioned by Hawksworth and Booth (1974) or Hawksworth (1979) in their monographic studies. Except for septation and germ pores, ascospore characteristics strongly suggest those of *Neotestudina rosatii* Segretain & Destombes (Hawksworth and Booth, 1974). *Lepidopterella palustris* Shearer & Crane (1980) of the Pleosporaceae is similar in that it also has angular but two-celled ascospores, and in its ascospore ontogeny.

Aue et al. (1969), using malt agar, found that *N. rosatii* (= *Pseudophaeotrichum sudanense* Aue et al.) exhibited optimum radial growth at 33°C. *Lepidopterella palustris* also grows more rapidly at 28°C than at 24-25°C. The thermotolerant character of this fungus is good evidence to support the inter-

generic relationships.

The fungus appears to be a rare species and occurred only once in the locality of the type.

***Apodus oryzae*** De Carolis & von Arx, C. B. S. Stud. Mycol. 8: 19. 1975.

Ascocarps immersed, scattered, dark olivaceous brown to nearly black, globose to subglobose, 450-800  $\mu\text{m}$  in diam, nonostiolate, covered with long, flexuous, light brown, septate, smooth-walled, hyphal-like hairs measuring 2-3  $\mu\text{m}$  in width. Peridium dark brown, opaque, rather thick, multi-layered; outer layer textura angularis to somewhat textura globulosa, composed of brown, thick-walled, isodiametric cells measuring 4-12  $\mu\text{m}$  in diam; inner layer textura

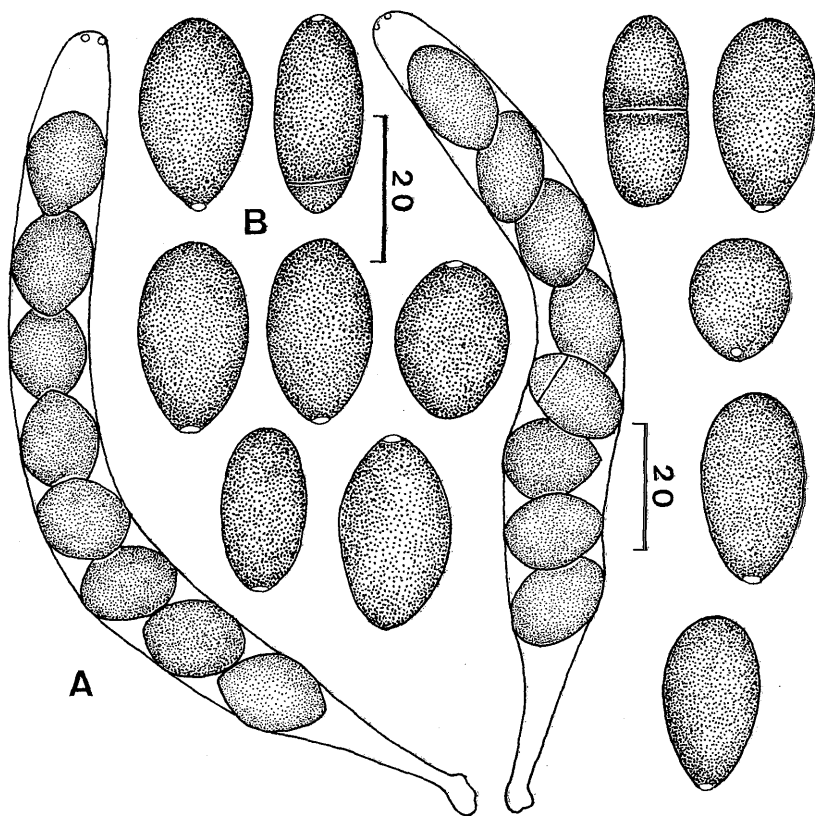


Fig. 2. *Apodus oryzae*, No. 2887, NHL. A: Asci. B: Ascospores. (All measurements are in  $\mu\text{m}$ .)

angularis, of large, hyaline to light brown, thin-walled, flattened cells measuring up to 25  $\mu\text{m}$  in diam. Asci 8-spored, cylindrical, (80-)100-130  $\times$  14-16  $\mu\text{m}$ , truncate above, with a distinct apical ring, short-stipitate, evanescent at maturity, in irregular fascicle; stipes 20-25  $\mu\text{m}$  long. Paraphyses indistinct, hyaline, septate, tubular, composed of swollen cells measuring 4-12  $\mu\text{m}$  in diam. Ascospores uniseriate or rarely biseriate in the ascus, brown, variable in shape and size, mostly ellipsoid to broadly fusiform, sometimes subglobose, (15-)17.5-27.5(-32.5)  $\times$  (10-)12.5-15(-19)  $\mu\text{m}$ , usually one-celled but rarely septate in either the middle or the lower third portions, mostly smooth-walled but sometimes partly pitted, with a single, distinct, apical or slightly subapical germ pore at one end; gelatinous covering indistinctly present, thin. Anamorph lacking.

Colonies on potato-carrot agar widely spreading, plain, thin, producing black ascocarps and prostrate aerial hyphae, white to buff; reverse uncolored.

At 37°C, growth is poor.

Isolation: marine sludge, Nagasaki Bay, Nagasaki City, Japan, 28 August 1979, collected by S. Ueda, No. 2887, NHL.

*Apodus oryzae* is a second species previously isolated only once from the sheaths of rice plants in Montara, Italy, as the type species (von Arx, 1975a). The Japanese strain was compared with the type description, to which it nearly exactly corresponds both in colony appearance and in microscopical features. The strain produces, however, larger ascocarps, and longer asci which contain one- or sometimes two-celled ascospores in mostly uniseriate arrangement. Most of the ascospores remain one-celled. In this respect, it strongly resembles members of the genus *Thielavia*, but can be easily distinguished by its *Sordaria*-type asci.

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### References

- Arx, J. A. von. 1975a. On *Thielavia* and some similar genera of Ascomycetes. C.B.S. Stud. Mycol. 8: 1-29. —. 1975b. On *Thielavia angulata* and some recently described *Thielavia* species. Kavaka 3: 33-36. — & E. Müller. 1975. A re-evaluation of the bitunicate Ascomycetes with keys to families and genera. C.B.S. Stud. Mycol. 9: 1-159. Aue, R., E. Müller & C. Stoll. 1969. *Pseudophaeotrichum sudanense* nov. gen. et nov. spec. Nova Hedwigia 17: 83-91.

Das, A. C. 1962. New species of *Thielavia* and *Sordaria*. Trans. Br. Mycol. Soc. 45: 545-548. Hawksworth, D. L. 1979. Ascospore sculpturing and generic concepts in the Testudinaceae (syn. Zopfiaceae). Can. J. Bot. 57: 91-99. — & C. Booth. 1974. A revision of the genus *Zopfia* Rabenh. C. M. I. Mycol. Pap. 135: 1-38. Malloch, D. & R. F. Cain. 1973. The genus *Thielavia*. Mycologia 65: 1055-1077. Shearer, C. A. & J. L. Crane. 1980. Taxonomy of two cleistothecial Ascomycetes with papilionaceous ascospores. Trans. Br. Mycol. Soc. 75: 193-200. Ueda, S. 1981. A mycofloral study of marine sludges in Nagasaki, Japan. Proc. 25 th Ann. Meeting Mycol. Soc. Japan. p. 73.

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上田は数年来、長崎県内の水圏底質について環境汚染との関係から菌類相を研究してきたが、1980年に長崎湾内の海泥から *Thielavia* 様の不整子のう菌類 2 種を分離した。詳細に検討した結果、これらはそれぞれ *Eremodothis angulata* および *Apodus oryzae* と同定されたが、両種とも最初に分離報告後、再び得られていない稀産種であり、かつ分類学的位置づけの不十分なところもあったので、報告することにした。

*Eremodothis angulata* は当初 *Thielavia* として報告されたが、その後 von Arx によって子のうが二重壁構造であることが指摘され、新属 *Eremodothis* に移された。その分類学的位置については、これまで必ずしも十分に論議が尽くされず、ドチディア目スボロールミア科に近いものとされるに止まっていた。著者らは本種がテストディナ科の *Neotestudina* あるいは、その近縁のプレオスポラ科に属する *Lepidopterella* などと子のう胞子の性質が子のう中での形成過程を含め非常に類似し（いずれも角形）、またこれらの菌類では 28-37°C の生育適温が特性であることも考え合せ、本種をテストディナ科に加えるとの意見を提案した。

*Apodus oryzae* は一見 *Thielavia* 様の子のう胞子を形成するが、子のうは円筒形で、先端に環状構造があり、明らかにソルダリア科の菌類とみなされる。本種の子のう胞子は稀に 1 隔壁が認められるものの、大部分は単細胞である。

□兵庫生物学会編：播磨の植物 神戸新聞出版センター，347 pp. 1981. ￥1,300, すでに「兵庫の自然」正，続，新を出版して県下の生物の紹介と知識の普及につとめてきた同会が、県下最大の地域である播磨の植物について、会員46名の協同執筆によってまとめたものである。内容は観察地の案内、珍植物の発見記、有用植物の紹介、方言、民俗、名木のいわれなどまことに多彩で、顕花植物はもちろん、シダ、コケ、菌、藻すべてにわたっている。当地の植物事情を知るうえで研究者にとって有用であるばかりか、一般向きにも楽しい本である。 (金井弘夫)